Name:

at1119paper: Complete the Square, $b =$ odd (v508)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 43x = -432$$

Add $\left(\frac{-43}{2}\right)^2$, which equals $\frac{1849}{4}$, to both sides of the equation.

$$x^2 - 43x + \frac{1849}{4} = \frac{121}{4}$$

Factor the left side.

$$\left(x + \frac{-43}{2}\right)^2 = \frac{121}{4}$$

Undo the squaring.

$$\begin{array}{rcl} x + \frac{-43}{2} = \frac{-11}{2} & \text{or} & x + \frac{-43}{2} = \frac{11}{2} \\ x = \frac{43 - 11}{2} & \text{or} & x = \frac{43 + 11}{2} \\ x = 16 & \text{or} & x = 27 \end{array}$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 21x = 1012$$

$$x^2 - 21x + \frac{441}{4} = \frac{4489}{4}$$

$$\left(x + \frac{-21}{2}\right)^2 = \frac{4489}{4}$$

$$\begin{array}{rcl} x + \frac{-21}{2} = \frac{-67}{2} & \text{or} & x + \frac{-21}{2} = \frac{67}{2} \\ x = \frac{21 - 67}{2} & \text{or} & x = \frac{21 + 67}{2} \\ x = -23 & \text{or} & x = 44 \end{array}$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 5x = 336$$

$$x^2 - 5x + \frac{25}{4} = \frac{1369}{4}$$

$$\left(x + \frac{-5}{2}\right)^2 = \frac{1369}{4}$$

$$x + \frac{-5}{2} = \frac{-37}{2} \quad \text{or} \quad x + \frac{-5}{2} = \frac{37}{2}$$

$$x = \frac{5 - 37}{2} \quad \text{or} \quad x = \frac{5 + 37}{2}$$

$$x = -16 \quad \text{or} \quad x = 21$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 37x = 848$$

$$x^2 - 37x + \frac{1369}{4} = \frac{4761}{4}$$

$$\left(x + \frac{-37}{2}\right)^2 = \frac{4761}{4}$$

$$x + \frac{-37}{2} = \frac{-69}{2} \quad \text{or} \quad x + \frac{-37}{2} = \frac{69}{2}$$

$$x = \frac{37 - 69}{2} \quad \text{or} \quad x = \frac{37 + 69}{2}$$

$$x = -16 \quad \text{or} \quad x = 53$$